Notice of Allowability	Application No.	Applicant(s)	
	10/784,965	SONG, BYUNG-CHEOL	
	Examiner	Art Unit	
	Seyed Azarian	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *7/25/2007, and fax inquiry on September 17, 2007*.

2. ☒ The allowed claim(s) is/are *1,3-12,14-20 and 22-30 now renumbered as 1-27*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Response to Amendment

1. Based on applicant's amendment, filed 7/25/2007, see page 11 through 14 of the remarks, also telephone interview and fax inquiry filed on September 17, 2007, with respect to cancellation of claims 2, 13 and 21, and amended claims 1, 8, 12, 20, 22, 25-26 and 30, have been fully considered and are persuasive, upon further consideration the claim rejection under 35 U.S.C. 112 paragraph and the rejection, of 103(a) for claims 1, 3-12, 14-20 and 22-30, are hereby withdrawn.

The claims 1, 3-12, 14-20 and 22-30 now renumbered as 1-27 are allowed.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it must be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Applicants Attorney (Mr. Christopher R. Lipp, Reg No. 41,157), on September 17, 2007, without traverse.

The amended claims as follows:

Examiner's Amendment for Application No. 10/784,965

Changes to claims:

Independent Claim 1 is amended to incorporate claim 2
Claim 2 is canceled
Claims 3, 4 and 7 are amended to depend on claim 1
Claim 8 is rewritten in independent form
Independent Claim 12 is amended to incorporate claim 13
Independent Claim 20 is amended to incorporate claim 21
Claim 21 is canceled
Claim 22 is rewritten independent form
Independent Claim 25 is amended to incorporate claim 2
Independent Claim 26 is amended to incorporate claim 13
New Claim 30 is added and corresponds to claims 1+8

1. (currently amended): A method of detecting a film image, comprising:

(a) receiving a predetermined number of similarity values of two adjacent fields of the same kind from an image having interlaced fields;

(b) classifying the similarity values which are received into a first group and a second group;

(c) converting the similarity values classified in the first group and the similarity values classified in the second group into values different from each other; and

(d) determining whether the image is a film image according to a period of the converted values,

wherein the similarity values comprise values of a sum of absolute differences

of differences between pixel values of the two adjacent fields of the same kind.

2. **(CANCELED)** ~~The method of claim 1, wherein the similarity values comprise values of a sum of absolute differences of differences between pixel values of the two adjacent fields of the same kind.~~

3. (currently amended): The method of claim [[2]] 1, wherein the predetermined number in step (a) corresponds to two times of a pattern period of the sum of absolute differences.

4. (currently amended): The method of claim [[2]] 1, wherein step (b) comprises:

(b1) aligning the values of the sum of absolute differences in a one-dimensional coordinate system;

(b2) setting a central point of the first group to 0, and a central point of the second group to a maximum value of the values of the sum of absolute differences;

(b3) comparing a distance between a position of a value of the sum of absolute differences and the central point of the first group with a distance between the position of the value of the sum of absolute difference and the central point of the second group, and classifying the value of the sum of absolute differences to a group in which the position of the central point is nearest to the position of the value of the sum of absolute differences;

(b4) updating the central point of the group in which the value of the sum of

absolute differences is classified; and

(b5) repeating steps (b3) and (b4) for additional values of the sum of absolute differences until the number of the values of the sum of the absolute differences classified in the first group and the second group is not changed.

5. (original): The method of claim 4, wherein in step (b4), the central point of the group in which the value of the sum of absolute differences is classified is updated to a central value between the original central point and an added value of the sum of absolute differences.

6. (original): The method of claim 4, wherein in step (b4), the central point is updated using the following equation:

$$C_0 = \frac{1}{n(\Phi_0)+1}[n(\Phi_0)\times C_0+SAD_i]$$

$$C1 = \frac{1}{n(\Phi_1)+1}[\,n(\Phi_1)\times C_1+SAD_i],$$

where C_0 represents the central point of the first group, C_1 represents the central point of the second group, SAD_i represents the predetermined number of values of the sum of absolute differences, Φ_0 and Φ_1 respectively represent the first group and the second group, and $n(\Phi_0)$ and $n(\Phi_1)$ respectively represent the number of the values of the sum of absolute differences classified in the first group and the second group.

7. (currently amended): The method of claim [[2]] 1, wherein in step (c), all of the values of the sum of absolute differences classified in the first group are converted into 0, and all the values of the sum of absolute differences classified in the second group are converted into 1.

8. (currently amended): ~~The method of claim 1,~~ A method of detecting a film image, comprising:

(a) receiving a predetermined number of similarity values of two adjacent fields of the same kind from an image having interlaced fields;

(b) classifying the similarity values which are received into a first group and a second group;

(c) converting the similarity values classified in the first group and the similarity values classified in the second group into values different from each other; and

(d) determining whether the image is a film image according to a period of the converted values

wherein the similarity values are values of a sum of magnitudes of motion vectors between the two adjacent fields of the same kind.

9. (original): The method of claim 8, wherein the predetermined number in step (a) corresponds to two times of a pattern period of the sum of magnitudes of motion vectors.

10. (original): The method of claim 8, wherein step (b) comprises:

(b1) aligning the values of the sum of magnitudes of motion vectors in a one-dimensional coordinate system;

(b2) setting a central point of the first group to 0 and a central point of the second group to a maximum value among the values of the sum of magnitudes of motion vectors;

(b3) comparing a distance between a position of a value of the sum of magnitudes of motion vectors and the central point of the first group with a distance between the position of the value of the sum of magnitudes of motion vectors and the central point of the second group, and classifying the value of the sum of magnitudes of motion vectors to a group in which the position of the central point is nearest to the position of the value of the sum of magnitudes of motion vectors;

(b4) updating the central point of the group in which the value of the sum of magnitudes of motion vectors is classified; and

(b5) repeating steps (b3) and (b4) for additional values of the sum of magnitudes of motion vectors until the number of the values of the sum of magnitudes of motion vectors classified in the first group and the second group is not changed.

11. (previously presented): The method of claim 10, wherein in step (b4), the central point of the group in which the value of the sum of magnitudes of motion vectors is classified is updated to a middle value between the original central point and an added value of the sum of magnitudes of motion vectors.

12. (currently amended): A method of detecting a film image, comprising:

(a) receiving a predetermined number of coordinate values consisting of the sum of absolute differences and motion vectors of fields of an image;

(b) classifying the coordinate values which are received into a first group and a second group;

(c) converting the coordinate values classified in the first group and the second group into values different from each other; and

(d) determining whether the image is a film image according to a period of the converted values.

wherein the image in step (a) has interlaced fields.

13. **(CANCELED)** ~~The method of claim 12, wherein the image in step (a) has interlaced fields.~~

14. (original): The method of claim 12, wherein the coordinate values consisting of the sum of absolute differences and the motion vectors are normalized using maximum values of the sum of absolute differences and the motion vectors.

15. (original): The method of claim 12, wherein the predetermined number of the coordinate values consisting of the sum of absolute differences and the motion vectors in step (a) corresponds to two times of a pattern period of the coordinates.

16. (original): The method of claim 12, wherein step (b) comprises:

(b1) aligning the coordinate values consisting of the sum of absolute differences and the motion vectors in a two-dimensional coordinate system;

(b2) setting a central point of the first group to (0, 0) and a central point of the second group to (1, 1);

(b3) comparing a distance between a position of a coordinate value consisting of the sum of absolute differences and the motion vectors and the central point of the first group with a distance between the position of the coordinate value consisting of the sum of absolute differences and the motion vectors and the central point of the second group, and classifying the coordinate value consisting of the sum of absolute differences and the motion vectors to a group in which the position of the central point is nearest to the position of the coordinate value consisting of the sum of absolute differences and the motion vectors;

(b4) updating the central point of the group in which the coordinate value consisting of the sum of absolute differences and the motion vectors is classified; and

(b5) repeating steps (b3) and (b4) for additional coordinate values until the number of the coordinate values consisting of the sum of absolute differences and the motion vectors classified in the first group and the second group is not changed.

17. (original): The method of claim 16, wherein in step (b4), the central point of the group in which the coordinate value consisting of the sum of absolute differences and the motion vectors is classified is updated to a middle value between the original value and an added coordinate value consisting of the sum of absolute

differences and the motion vectors.

18. (original): The method of claim 16, wherein in step (b4), the central point is updated using the following equation:

$$C_0 = \frac{1}{n(\Phi_0)+1}[n(\Phi_0)\times C_0+(SAD'_i, M'_i)]$$

$$C1 = \frac{1}{n(\Phi_1)+1}[\, n(\Phi_1)\times C_1+(SAD'_i, M'_i)],$$

where C_0 represents the central point of the first group, C_1 represents the central point of the second group, (SAD'_i, M'_i) represents the input predetermined number of coordinate values consisting of the sum of absolute differences and the motion vectors, Φ_0 and Φ_1 respectively represent the first group and the second group, and $n(\Phi_0)$ and $n(\Phi_1)$ respectively represent the number of the values of the sum of absolute differences and the motion vectors classified in the first group and the second group.

19. (original): The method of claim 12, wherein in step (c), all of the coordinate values consisting of the sum of absolute differences and the motion vectors classified in the first group are converted into 0, and all the coordinate values consisting of the sum of absolute differences and the motion vectors classified in the second group are converted into 1.

20. (currently amended): An apparatus for detecting a film image, comprising:

a characteristic information receiving portion for receiving similarity values of two adjacent fields of the same kind from an image having interlaced fields;

a grouping portion for grouping the similarity values received by the characteristic information receiving portion; and

an image determining portion for determining whether the image is a film image according to a period of output values converted into a binary pattern after grouping

wherein the similarity values are a sum of absolute differences meaning differences between pixel values of the two adjacent fields of the same kind.

21. **(CANCELED)** ~~The apparatus of claim 20, wherein the similarity values are a sum of absolute differences meaning differences between pixel values of the two adjacent fields of the same kind.~~

22. (currently amended): ~~The apparatus of claim 20,~~ An apparatus for detecting a film image, comprising:

a characteristic information receiving portion for receiving similarity values of two adjacent fields of the same kind from an image having interlaced fields;

a grouping portion for grouping the similarity values received by the characteristic information receiving portion; and

an image determining portion for determining whether the image is a film image according to a period of output values converted into a binary pattern after

grouping.

wherein the similarity values are a sum of magnitudes of motion vectors of the two adjacent fields of the same kind.

23. (original): The apparatus of claim 20, wherein the similarity values are coordinate values obtained using information regarding the sum of absolute differences and information regarding the sum of motion vectors.

24. (original): The apparatus of claim 23, wherein the coordinate values consisting of the sum of absolute differences and the motion vectors are normalized with respect to maximum values of the sum of absolute differences and the motion vectors.

25. (currently amended): A computer-readable recording medium having recorded thereon a program for executing an image detection method in a computer, the method comprising:

(a) receiving a predetermined number of similarity values of two adjacent fields of the same kind from an image having interlaced fields;

(b) classifying the similarity values which are received into a first group and a second group;

(c) converting the similarity values classified in the first group and the second group into values different from each other; and

(d) determining whether the image is a film image according to a period of the

converted values,

wherein the similarity values comprise values of a sum of absolute differences of differences between pixel values of the two adjacent fields of the same kind.

26. (currently amended): A computer-readable recording medium having recorded thereon a program for executing an image detection method in a computer, the method comprising:

(a) receiving a predetermined number of coordinate values consisting of a sum of absolute differences and motion vectors of fields constituting an image;

(b) classifying the coordinate values consisting of a sum of absolute differences and the motion vectors into a first group and a second group;

(c) converting the coordinate values consisting of the sum of absolute differences and the motion vectors classified in the first group and the second group into values different from each other; and

(d) determining whether the image is a film image according to a period of the converted values,

wherein the image in step (a) has interlaced fields.

27. (previously presented): The method for detecting a film image according to claim 1 wherein the detecting occurs without setting a threshold using grouping.

28. (previously presented): The method for detecting a film image according to claim 12 wherein the detecting occurs without setting a threshold using grouping.

29. (previously presented): The apparatus for detecting a film image according to claim 20 wherein the detecting occurs without setting a threshold using grouping.

30. (new): A computer-readable recording medium having recorded thereon a program for executing an image detection method in a computer, the method comprising:

(a) receiving a predetermined number of similarity values of two adjacent fields of the same kind from an image having interlaced fields;

(b) classifying the similarity values which are received into a first group and a second group;

(c) converting the similarity values classified in the first group and the second group into values different from each other; and

(d) determining whether the image is a film image according to a period of the converted values,

wherein the similarity values are values of a sum of magnitudes of motion vectors between the two adjacent fields of the same kind.

REASONS FOR ALLOWANCE

3. The following is an examiner's statement of reasons for allowance.

This invention relates generally, to image signal processing, and more particularly, to a method and apparatus for determining whether an input image is a film image.

Based on applicant's amendment, with respect to claim 1 representing claims 8, 12, 25-26 and 30, the closest prior art of record (Demos and Ohmi), Demos reference is directed to processing of digitally encoded video and movie signals, and more particularly to a system and method for de-interlacing, motion compensation and/or frame rate conversion of digitally encoded video and movie signals. Ohmi reference is directed to a computing circuit having an instantaneous recognition function and to a method for instantaneous recognition, and more particularly relates to a computing circuit which accepts external data, but do not teach or suggest, among other things, " classifying the similarity values which are received into a first group and a second group and converting the similarity values classified in the first group and the similarity values classified in the second group into values different from each other, and determining whether the image is a film image according to a period of the converted values, wherein the similarity values comprise values of a sum of absolute differences of differences between pixel values of the two adjacent fields of the same kind".

Additionally claim 20 representative of claim 22, the closest prior art of record (Demos and Ohmi) do not teach or suggest, among other things, "a characteristic information receiving portion for receiving similarity values of two adjacent fields of the same kind from an image having interlaced fields, a grouping portion for grouping the similarity values received by the characteristic information receiving portion, and an image determining portion for determining whether the image is a film image according to a period of output values converted into a binary pattern after grouping, wherein the similarity values are a sum of magnitudes of motion vectors of the two adjacent fields of the same kind".

These key features in combination with the other features of the claimed invention are neither taught nor suggested by (Demos and Ohmi) prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Azarian whose telephone number is (571) 272-7443. The examiner can normally be reached on Monday through Thursday from 6:00 a.m. to 7:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached at (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.
Status information about the PAIR system, see http:// pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seyed Azarian
Patent Examiner
Group Art Unit 2624
October 1, 2007

Seyed Azarian